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Claims

1. Method for producing a zirconium alloy semi-finished product (3) containing by weight at least 97% zirconium, intended for the production of at least one elongated product, in which a large ingot (1) is produced by casting the zirconium alloy, then the semi-finished product (3) intended to be formed to obtain the elongated product is produced by two-stage forging of the large ingot (1), characterised in that the first forging stage (2) of the large ingot (1) is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy.

2. Method as claimed in claim 1, characterised in that at the temperature of the first forging stage, the ingot contains a volume proportion of zirconium alloy in the α phase between 10% and 90%, the remainder of the zirconium alloy of the ingot being in the β phase.

3. Method as claimed in claim 1 or claim 2, characterised in that the first forging stage (2) is performed at a temperature between 850°C and 950°C.

4. Method as claimed in claim 3, characterised in that the first forging stage is performed at a temperature of around 900°C.

5. Method as claimed in claim 1 or claim 2, characterised in that the first forging stage is performed at a temperature between 600°C and 950°C.

6. Method as claimed in any of claims 1 to 5, characterised in that the second forging stage is performed at a temperature at which the zirconium alloy of an intermediate product (3') obtained by the first forging stage (2) of the ingot (1) is in the α phase.

7. Method as claimed in any of claims 1 to 5, characterised in that the second forging stage is performed at a temperature at which the zirconium alloy of an

replaced by Art 19

intermediate product (3') obtained at the end of the first forging stage (2) of the ingot (1) is in a state comprising crystalline α and β phases of the zirconium alloy.

8. Method as claimed in any of claims 1 to 7, characterised in that the zirconium alloy contains at least 3% by weight in total of the additive elements comprising at least one of the elements tin, iron, chromium, nickel, oxygen, niobium, vanadium and silicon, the remainder of the alloy being constituted by zirconium with the exception of the inevitable impurities.

9. Use of the method as claimed in any of claims 1 to 8 for production of a semi-finished product such as a bar or rod intended for production of a tubular product for manufacture of a fuel assembly element such as a jacket tube or a guide tube for a fuel assembly for a water-cooled nuclear reactor or a fuel assembly element for a CANDU reactor.

10. Use of the method as claimed in any of claims 1 to 7 for production of a bar intended for production of a small diameter plug bar for manufacture of plugs closing the ends of the jacket tubes of fuel assembly rods for nuclear reactors.